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Faculty of Medicine

Master of Health Professions Education

**Factors affecting the Academic Performance among Students at
Faculty of Medical Laboratory Science at International University
of Africa Sudan 2021**

BY

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DEDICATION

I dedicate my dissertation work to my family. To my dear soul mother, to the most precious man in my life father, to whom my sister supported me, my teachers in master of Health Professions Education.

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I would like to thank all people who helped to make this thesis possible. I wish to express my sincere thanks and appreciation to the followings:

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ABSTRACT.

Background: Student's academic performance is very important and attracts the attention of all those involved in higher education system as the students' academic performance plays a vital role in creating the finest quality of alumnae, the academic performance of the students has gained significant attention in past researches. Performance of students is affected by psychological, economic, social, personal and environmental factors as well as learning styles and academic previous background. This study aimed to determine the factors influencing academic performance of Student at Faculty of Medical Laboratory Science in international university of Africa in 2021.

Material and methods:

A descriptive cross-sectional study was done at Faculty of medical laboratory science - international university of Africa at Khartoum from February 2021 to June 2021.

A self-administered questionnaire by Google form was allocated to 525 Medical laboratory students from third and fourth years, 267 students were in semester (6) meanwhile 258 of them were in semester (8) the number of students with low academic performance CGPA less than 2.5 were 52 students. 45 students of them accepted to participate in the study (Response rate is 86.5%) Which were enough samples from the 52 students with 95% level of confidence? The GPA score of 3.5 (out of 4) were included and compared to medical laboratory students with a CGPA (Less than 2.5) who were available at the time of the study. Data was analyzed by SPSS version 23. Frequency Tables and charts were constructed for qualitative and quantitative variables accordingly. Associations of academic performance with factors affecting academic performance were determined by chi-square.

Results: from total of 260 undergraduate medical laboratory students participated in the study, 215 of them with CGPA 3.5 or more and 45 students with a CGPA less than 2.5. This study showed a statistically significant relationship between performance and the father's occupation, presences with family and chronic medical condition during medical studding (Bronchial asthma, Migraine, Insulin dependent Diabetes Mellitus and corrected congenital heart defect are some examples). The admission to the faculty, whether general or private, secondary school certificate type, sleeping hours per day between 6-8 hours, attendance to all academic and clinical activities and student's own notes and textbook as a primary source of studying (P value < 0.05). Excellent medical laboratory students have many different factors. For example, they do not sleep more

than 8 hours\day. They have good attendance profile and academic performance was not affected by their economic backgrounds.

Conclusions& Recommendations: The study therefore concluded that students' academic performance could be influenced by some other factors which should be investigated in future research using different tools, students with chronic illnesses and impairments should be given extra attention and to Increase the overall attendance of students as well as Interactive Lectures and tutorials must be considered.

Keywords: Academic performance, medical laboratory, Faculty, Admission, GPA, students, learning.

المستخلص

خلفية مرجعية : تقييم الاداء الاكاديمي لطلاب المرحلة الجامعية هو أمر مهم ليصبح محط اهتمام كل منسوبي قطاع التعليم العالي، كما أن عملية تقييم الاداء الاكاديمي المستمر لها الدور الاكبر في انتاج منظومة خريجين على قدر عالي من المؤهلات الأكاديمية و المقدرات العلمية ، و قد تم التوصل من خلال عدد من البحوث العلمية لمدى الدور الكبير الذي تلعبه عوامل مختلفة في التأثير على الاداء الاكاديمي منها طرائق التدريس، العوامل الاجتماعية و النفسية للطلاب بجانب الخلفية الاكاديمية منذ مراحل التحصيل الاولية.

الهدف من الدراسة: هدفت هذه الدراسة الى تحديد أثر العوامل المختلفة على الاداء الاكاديمي لطلاب كلية المختبرات الطبية بجامعة افريقيا العالمية بالسودان خلال العام 2021.

طريق و مواد الدراسة: تم إجراء دراسة وصفية مقطعية – مؤسسية ، في كلية علوم المختبرات الطبية بجامعة افريقيا العالمية بالخرطوم، السودان في الفترة من فبراير 2021- يونيو 2021. تم استخدام طريقة الاستبيان لجمع المعلومات عبر فورمات قوقل و استهدفت طلابالمستوى 3,4 من كلية المختبرات الطبية البالغ عددهم 525 طالب و طالبة ، 27 طالب بالفصل الدراسي السادس بينما 258 طالب يدرس بالفصل الدراسي الثامن، كما قد تم تضمين متوسط معدلات تراكمية من 3.5 من 4 ومقارنتهم بطلاب المختبرات الطبية الحاصلين علي معدل تراكمي اقل من 2.5 و الذين كانوا متاحين في وقت الدراسة و بموافقة 45 طالب منهم بالمشاركة في الدراسة بمعدلات استجابة بلغت 86.5% و قد تم تحديد نسبة 95% كمستوى ثقةوقد تم تحليل البيانات الكمية للدراسة بواسطة برامج التحليل الاحصائي (SPSS) الاصدار رقم 23، و قد تم إنشاء الجداول والمخططات للمتغيرات النوعية والكمية وفقا لذلك كما تم تحديد درجة الارتباط ما بينالتحصيل الأكاديمي و العوامل المؤثرة علي الأداء الأكاديمي بواسطة مربع كاي.

النتائج: شارك في هذه الدراسة عدد 260 طالب من كلية المختبرات الطبية بجامعة افريقيا، 215 منهم بمعدل تراكمي 3.5 او اكثر و45 طالبا منهم بمعدل تراكمي اقل من 2.5. اظهرت هذه الدراسة وجود دلالة إحصائية في العلاقة ما بين بين الاداء الاكاديمي، و ما بين حالة المرض أو العجز المصاحب للطلاب نفسه (أمراض مثل الازمة، الصداع النصفي ، مرض السكري) ، كما هو الحال بالنسبة للعلاقة ما بين الاداء الاكاديمي والمستوي التعليمي للأب ، وجود طبيب في الأسرة، والقبول بالكلية سواء كان قبول عام أو خاص ، و التحصيل بشهادة الثانوية العامة، وعدد محاولات امتحان المرحلة الثانوية، وعدد ساعات النوم في اليوم، وأيضا المداومة على الحضور لجميع أنشطة الكلية الأكاديمية والسريرية، ومن أبرز الملاحظات أن الطلاب المتميزين أكاديميا لديهم كثير من العوامل المؤثرة على أداءهم الاكاديمي ومنها عدم النوم لأكثر من 8 ساعات يومية، كما أن لهم سجل حضور دراسي جيد و لم. يتأثر ادأؤهم الأكاديمي بخلفياتهم الاقتصادية.

الاستنتاجات و التوصيات: خلصت الدراسة الي أن الأداء الأكاديمي للطلاب يمكن ان يتأثر ببعض العوامل الأخرى التي يجب التحقق فيها بشكلأكثر من خلال بحوث قادمة و بأدوات مختلفة. كما قد أوصى بضرورة توفير اهتمام اكاديمي أوسع بالطلاب المصابين بالأمراض المزمنة و بالعجز الجسدي مع تعزيزنسب الحضور و ضرورة اتباع طرق التدريس الالكترونى و وضعها في الاعتبار.

الكلمات الدالة : الاداء الاكاديمي ، المختبرات الطبية،الكلية، القبول، المعدل التراكمي، الطلاب، التدريس.

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ABBREVIATIONS:

AAMC **Association of American Colleges**

CA **Continuous assessment**

CGPA **Cumulative Grade Points Average**

GPA **Grade Point Average**

Igcse **International general certificate of secondary school**

SES **Socioeconomic Status**

SSCE **Sudan School Certificate Examination**

SPSS **Statistical Package for the Social Sciences**

WHO **World Health Organization**

Chapter (1)

Introduction

1.1. Introduction

Student's academic performance is very important and attracts the attention of all those involved in higher education system (2, 3). For any educational institute students are most important asset. Universities and colleges have no value without students. Economic and social development of a country is directly associated with academic performance of students. The students' academic performance plays a vital role in creating the finest quality alumnae who will become leader and manpower of a particular country, consequently responsible for the country's social and economic development (4). The academic performance of the students' has gained significant attention in past researches. Performance of students is affected by psychological, economic, social, personal and environmental factors. Though these factors strongly influence the performance of the students, but these factors differ from country to country and person to person.

In this era of globalization and technological revolution, education is considered as a first step for every human activity. It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living (5). It ensures the acquisition of knowledge and skills that enable individuals to increase their productivity and improve their quality of life. This increase in productivity also leads towards new sources of earning which enhances the economic growth of a country (6). The quality of students' performance remains at top priority for educators. It is meant for making a difference locally, regionally, nationally and globally. Educators, trainers, and researchers have long been interested in exploring variables contributing effectively for quality of performance of learners. These variables are inside and outside university that affect students' quality of academic achievement. These factors may be termed as student factors, family factors, school factors and peer factors (7). Generally these factors include age, gender, geographical belongingness, ethnicity, marital status, socioeconomic status (SES), parents' education level, parental profession, language, income and religious affiliations. Besides other factors, socioeconomic status is one of the most researched and debated factor among educational professionals that contribute towards the academic performance of students. The most prevalent argument is that the socioeconomic status of learners affects the quality of their academic performance. Most of the experts argue that the low socioeconomic status has negative effect on the academic performance of students because the

basic needs of students remain unfulfilled and hence they do not perform better academically (8). The low socioeconomic status causes environmental deficiencies which results in low self esteem of students (9). More specifically, this study aims to identify and analyze factors that affect the students' academic performance in medical laboratory sciences.

1.2 Rationale (Justification):

In medical college when students are enrolled and start learning activities, their academic performance varies widely. Some students try to do their best to stay in the top level, while others barely try to pass; finding out why some students perform well academically and factors that affect students performance is important, as this understanding can then be used to promote the factors that contribute to high academic performance and achieve institution/universities desired outcome. Some currently studies stated obvious effect of pre-admission criteria, socio-demographic factor, study habits and learning styles on medical laboratory student's performance.

1.3- Research question:

What are the factors that affecting the academic performance among the students of Faculty of medical laboratory sciences in International University of Africa Sudan 2021?

1.4 Literature Review

Many studies have stated that academic performance of students is influenced by different factors such as the academic commitments and university lifestyle including new social and competitive academic environment impact students' personality, studying skills, and sleep pattern which all may affect the academic performance of university students (2, 3, 10 and 11).

1.4.1 Sociodemographic Factors:

Sociodemographic factors play important role in education and have strong relationship with academic performance (12). (13) State that relationships are contingent upon a number of factors that it is nearly impossible to predict academic performance using socioeconomic status. In other side many of previous studies demonstrate that family influences, such as family education and the presence of physicians in the family, affects the performance of students (14). Also recent study from Saudi Arabia showed higher academic performance among female and married students (15). According to AAMC socioeconomic factors can affect educational opportunities and outcomes, furthermore, most of medical students come from the high two levels of family income; and SES mainly based on family education and occupation (16).

Additionally, regard to gender, female medical students are outnumbered male medical students, as is observed in all Sudanese medical schools, the exact cause for is unknown (17) The effect of the gender of the student on the academic performance of the medical students has been studied by the researchers at King Saud University which conclude that the female medical students were high in academic performance when compared to male students (18).

One study showed that in overall test assessment female medical students out performed male students, although this study suggested an evidence of male dominance in enrollment proportion, but female students were dominant in performance. Similar facts of female students outperforming male students were also found in other field as agricultural science (19).

1.4.2 Pre-admission Criteria:

In Sudan most important criterion of selection for medical students is school Certificate Examination (SSCE) and only students with high-grade selected for medical college (17).

The selection of students for the health professions is typically a very competitive multi-staged process that includes assessment of both cognitive abilities and personal qualities (20). Most of previous health professions education studies support the use of various selection tools, but

application of pre-admission overall grade point average (GPA) in student's selection is the excellent predictor of academic performance (20).

Associations between language background, English language proficiency and medical communication skills were investigated in a group of 149 third year undergraduate medical students studying at an Australian university. Written and aural English proficiency were assessed with the Screening Test for Adolescent Language, students who speak English as second language face considerable challenges in English language universities, but little is known about the relationship between English- Language acculturation and academic performance (21).

Previous good academic performance is an important, but not perfect predictor of achievement in medical schools, it accounts for 23% of the variance in performance in undergraduate medical training and 6% of that in postgraduate competency (22). Subsequently, long term prospective cohort studies or case- control studies are needed to examine predictors of success after qualification, and reliable, valid, and fair models of medical job competence need to be developed (22).

1.4.3 Study Habits and Learning Styles:

Better predictors of student's performance are students' approaches to their work, or their study habits, also deep strategic learning styles predict success in final examinations at university, whereas surface learning predicts failure (23). Recent studies suggest there are strong relations between students' learning styles and approaches to study with academic success (24).

Medical students have different study habits but due to heavy demands of the academic environment, students are involved in the late- night study and excessive Internet use and some also consume stimulants to stay awake at night and present data showed that; the majority of the average student study group goes to bed later than midnight during weekdays; similarly a study conducted in Lebanon among university students and concluded that 89.9 % of the responders went to bed after 11 pm on weekdays (25). Furthermore, medical students attendance consider as important factor in the academic performance, there was a positive correlation between total attendance and overall examination score and this association persisted after adjusting for student age, sex, country of origin, previous examination failure, and the timing of the rotation during the academic year(26). Contrarily, some studies found that a mandatory attendance policy increased attendance but did not increase academic performance within basic science lectures (27). However, attendance at both clinical and classroom-based teaching activities and its

association with academic performance within clinical rotations has not been examined previously and the positive correlation between attendance and academic performance in Deane and Muraphy's study was higher than that reported in the existing literature and raises the possibility that students attendance have positive impact on academic achievement (28).

Study skills are pre-requisite for educational success and it is one of important component of learning activities, various students have various study practices based on their study habits and their interest in subject (29). Mastering study skills makes study more enjoyable and effective which in turn strengthen the students' interest so he/she spends more time studying, make learning easy, better learning, better academic performance in Africa (30).

The interaction between personality and environmental factors and their effect on academic achievement is a rather complex process, there are many variables involved and generalizations cannot be easily drawn (2). Academic success is not achieved by one single studying strategy, (31) state the fact that students prefer information to arrive in a variety of modes, and students do not learn by simply sitting in a classroom listening to the educator and memorizing assignments, so to achieve meaningful education, the learning process must be interactive, and students should be able to integrate their knowledge and information to real experience. The reported use of various information sources also was important factor affect the academic achievement, top students were less likely to rely on notes provided by other students, whether from the same class or from outgoing classes (32). However, these sources accounted for relatively few study hours and suggest more similarities than differences in the study habits of students across performance groups.

1.4.4 Measuring Students Success:

When students are admitted to a higher education institution there is an inferred assumption that they will be capable of successfully completing the course in which they are permitted to enroll. To knowingly admit students who, for whatever reason, have no chance of academic success would be immoral. Therefore, it is necessary to have entry requirements that permit valid student selection decisions to be made. Assessments differ widely in nature and quality, and assessment policies as well as practices are often applied in different ways across school and programme types. It is a process prescribed for testing qualification, an exercise designed to examine progress or knowledge Nigeria (33). Diverse means of measuring students' success exist and this

includes: Continuous Assessment (CA) and Examination, Grade Point Average (GPA), Graduation and retention rate etc.

Examinations which are an organized activity aimed at determining the cumulative or broad knowledge in a students' educational development (33), have been widely used to evaluate student's success and performance in formal school settings. At a higher education level, it helps to establish the integrity of the degree or certificate awarded by any higher institution. When CA and Examination are used to find out students' level of understanding, the examiner must consider the validity and reliability of the test instruments used for this purpose (34). Suggests that the purpose of test is to identify or discover what a person can do under certain controlled circumstances. Thus the examiner must not deviate from the objectives upon which the tests are based (33). Further assert that the test can be rendered invalid and unreliable if not administered under a favorable condition no matter what effort went into the preparation of the test. Thus examinations serve evaluation purposes and are meaningful to all parties involved if it is used to motivate average learners (34).

1.5 Objectives

1.5.1 General Objective:

To determine the factors influencing academic performance of Student at Faculty of Medical Laboratory Science in international university of Africa Sudan.

1.5.2 Specific Objectives:

- To identify the effect of students' pre- admission academic performance (admission level) on academic performance of medical laboratory students.
- To identify the influence of English language proficiency on academic performance of medical laboratory students.
- To determine the effect of social and economic status on academic performance of medical laboratory students.
- To determine the effect of attendance of academic activities performance of medical laboratory students.
- To determine the influence of different study habits and learning styles on academic performance of medical laboratory students.
- To compare these factors between Students with excellent academic performance and Students with low performance High and Low CGPA

Chapter (2)

Methodology

2. Materials and Methods

2.1 Study Design

A descriptive cross-sectional study

2.2 Study Area

The study has been conducted on in Faculty of medical laboratory science/ international university of Africa is a private university in Khartoum, Sudan. It is a member of the federation of the universities of the Islamic world. The university has faculties of education and humanities, shariah and Islamic studies, of pure and applied science, medicine and engineering.

Vision

Providing graduates with the necessary knowledge and experience in the fields of work in medical laboratories, which include isolating and diagnosing bacteria present in different clinical samples, preparing tissue slides for various organs of the body and preparing them for examination. Areas of public health in the community.

Mission

Achieving excellence in teaching and learning, acquiring scientific skills, implementing educational and training programs and research activities, which leads to enhancing the high ability in diagnosing various diseases and developing preventing and curative health services so that they are accessible to all members of society.

2.3 Study Population

It included all the Students of medical laboratory science/ international university of Africa batch 3 and 4

2.4 Inclusion Criteria

- Students in the third and fourth year
- Students with excellent academic performance (The Cumulative Grade Point Average (CGPA) equals or more than 3.5 was considered as excellent academic performance).
- Students with low performance (The Cumulative Grade Point Average (CGPA) less than 2.5 was considered as poor academic performance)

- Final year (4th year) students have the greatest undergraduate academic experience. The Cumulative Grade Point Average (CGPA) will reflect the academic performance during the whole period.

2.5 Exclusion Criteria:

- Students in first, second batch.
- Students with moderate performance.
- Students who refuse to participate in the study.

2.6 Sample size:

Total coverage for all students fit in inclusion criteria at the time of the study.

2.7 Data collection tool:

In this study, the tool of data collection used was Self-administered Questionnaire by Google form. The questionnaire include: sex, age, CGPA, academic performance, study habits and learning style, motivation in studying medicine, medical illness, economic and social factors (38).

2.7.1 Designing & validation of Questionnaire

A prior literature search was done for factors that affect academic performance of students (35, 36). Questionnaire had 30 questions in English by Google form focusing on important factors associated with academic performance of the students:

- Individual factors like interest, problems related to language/ understanding
- Factors related to pre admission
- Impact of teaching –learning methods used
- Factors related to learning style
- Factors pertaining to family

Majority of questions had responses graded on a Likert scale of 1 to 5, while some had clear options given to identify specific factors.

2.8 Data management and analysis:

The collected data was cleaned, coded , entered in master sheet and analyzed by statistical package for social science (IBM SPSS Inc.Chicago, version no 23) software. Chi -square test

will be used for comparing categorical data; level of significance will be set at 0.05, the table will be constructed using Microsoft word.

2.9 Ethical and Legal Consideration:

- Clearance and approval for conducting this study was be obtained from their research ethical committee in IUA.
- A student was requested to participate voluntary in the study and INFORM CONCENT form consent will be distributed to them.
- Information was treated was confidentiality. Students who refused to participate in the study will be excluded.

Chapter (3)

Results

3-1 Results

The total number of students induced in the study in the clerkship period was 525 students. 267 students were in semester (8), while 258 were in semester (10).

The number of students with low academic performance CGPA less than 2.5 were 52. 45 of them accepted to participate in the study (Response rate is 17.2%) Which are enough samples of the 52 students with 95%.

Confidence level and 25.7% confidence interval 281 students with CGPA 3.5 or more, 216 of them accept to participate in the study with (82.8%) response.

Out of the 525 students 171 were males which is (32.6%) while 354 (67.4%) were females. It was approximately the same percentage of participants in the study (20 out of 73 were male 28.1%). Also out of the 45 students with CGPA less than 2.5, four were male (17.3%). This ratio of male to female students is reflective of the overall student population. Gender does not affect the academic performance of the participants in this study. Figure (1)

260 students responded to the questions about social, family and marital status. Out of them only two students (2.7%) were married both of them were females. 3 divorced medical students was found (1.2%). The following factors were assessed (Marital status, family size whether the student no lives with his family or in the university hostel or not and the presence of family problems such as disease or disability, divorced parents, death of a family member). They were found not significantly affect the academic performance of the study population. (P value < 0.05) see table (1),(2),(3) and Figure (2). In contrast chronic medical problems and diseases during the study period of the medical laboratory student her\himself significantly affect their academic performance. (P value=0.023).Table (3).

Social-economic status of the student s family was not found significantly influence their academic performance (P value > 0.05). Whether the student is financially supported by parents or other family member, relative or supported her\himself were not found significantly influence their academic performance (P value > 0.05).Table (4).

Parents' level of education and the mother profession and the presence of physician as guidance in the family were assessed and found not statistically affect medical student's academic performance. The profession of the father both influences the academic performance of the medical student. (P values = 0.021 and 0.180 respectively).Table (6), (7) and Figure (3).

Preadmission criteria like admission to the university whether general or private influence the academic performance of the students. (P values = 0.002)Table (8). Secondary school examination type and the number of secondary school examination attempts were both no statistically influence the academic performance of the students. P values = (0.241 and 0.345 respectively). Table (9).

English language proficiency was assessed and it had no significant effect on the academic performance (P value = 0.222). Table (10)

Time spending on TV has no significant (p values =0.957 value for no watching) Table (11). Networking, chatting social has significant influence on the academic performance of the students when more than 4 hours (p values =0.035) Table (11).

Sleeping hours per day showed no a significant correlation with academic performance when less than 6 hours (p value=0.541) and significant correlation with academic performance when sleeping between 6-8 hours (p value= 0.048) Table (12)

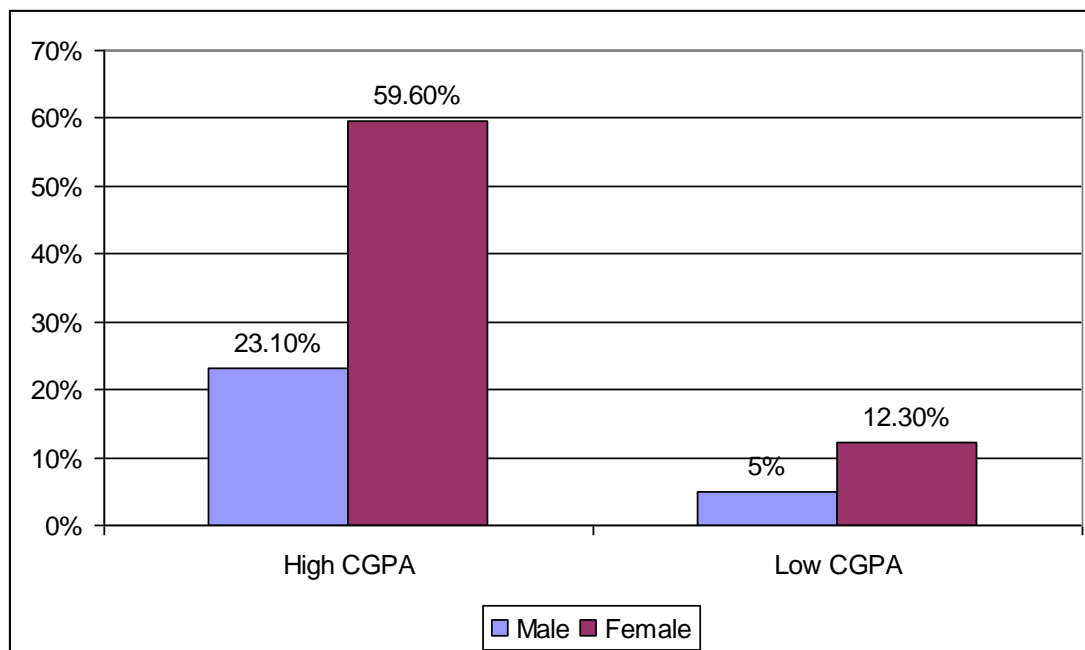
There was no significant difference between those who had higher or lower CGPA when it came to motivation to study, studying in a group alone or with one colleague, studying hours per day, studying hours at weekends and the use of the followings while studying (Mapping, Note Forming, Highlighting, Summarizing, recording, etc.....) (P value > 0.05) Table(13)(14).

What students did when facing difficulty in studying had no influence on their academic performance (P value = 0.696) Table (16).

How they spend their vacation had no influence on their academic performance (P value = 0.447) Table (17).

The most commonly used reading resources among students the internet and other resources like watching video lectures. While the least used were Using textbooks as the primary source of knowledge, handouts and notes was not correlated to the academic performance, while using internet showed a positive influence on the outcome (p value 0.011). Using other reading resources like textbook, notes as the primary resource was associated with poor academic performance (P value 0.005). Figure (4).

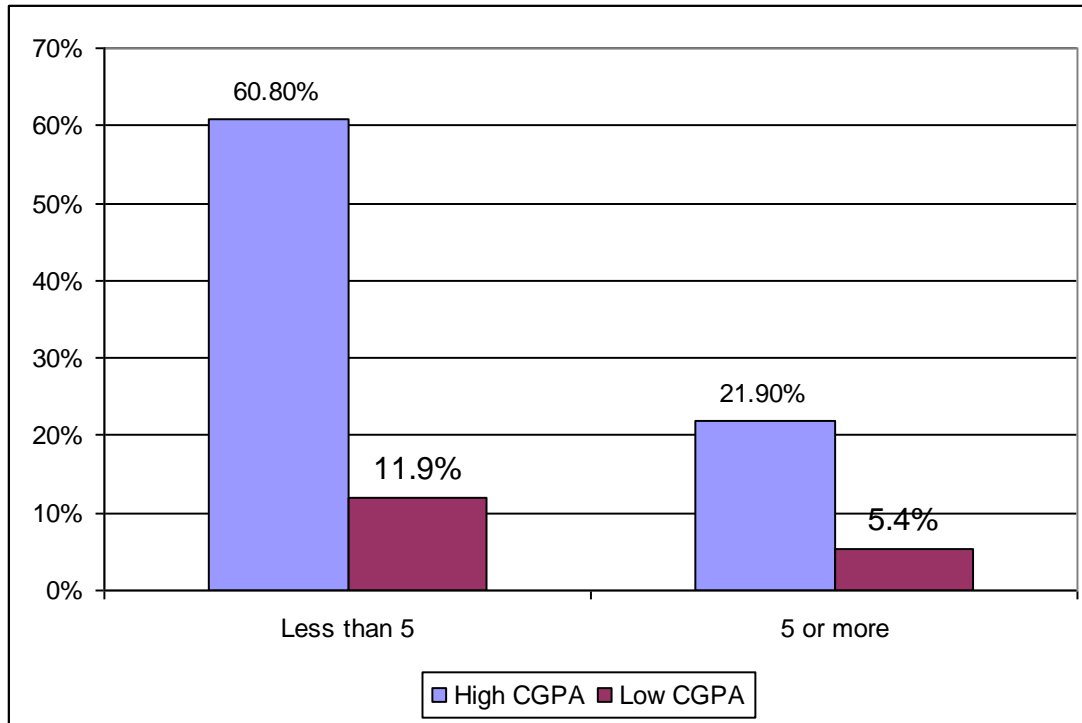
Attendance of the students is excellent to all activities in practical sessions, lectures, tutorial, PBL and clinical teaching Figure (5). Significant differences were observed between the two groups with regard to attendance of lectures, tutorials, practical sessions, PBL activities and clinical teaching. P values = (0.011- 0.000- 0.000- 0.013- 0.000 respectively) Table (5).



Figur (1): Correlation between gender of participants and academic performance of medical laboratory students with

Table (1): Correlation between social status of participants and academic performance of medical laboratory students.....

Social Status	High CGPA	Low CGPA	Total	P. value
Single	190 (73.1%)	43 (16.5%)	233 (89.6%)	0.365
Married with Children	11 (4.2%)	2 (0.8%)	13 (5%)	
Married without children	11 (4.2%)	0 (0%)	11 (4.2%)	
Divorced	3 (1.2%)	0.0%)	3 (1.2%)	



Figur (2): Correlation between family size of participants and academic performance of medical laboratory students.....

Table (2): Correlation between presence with family of participants and academic performance of medical laboratory students.....

	High CGPA	Low CGPA	Total	P. value
Live with family	High CGPA	Low CGPA		
Yes	119 (45.8%)	29 (11.2%)	148 (56.9%)	0.041
No	96 (36.9%)	16 (6.2%)	112 (43.1%)	0.170

Table (3): Correlation between family suffering of participants and academic performance of medical laboratory students.....

Problem in family	High CGPA	Low CGPA	Total	P. value
Chronic illness	40 (15.4%)	5 (1.9%)	45 (17.3%)	0.023

Death of a fist relative during medical studying	35 (13.5%)	5 (1.9%)	40 (15.4%)	0.023
Divorced parents	16 (6.2%)	3 (1.2%)	19 (7.3%)	0.391
No problem	124 (47.7%)	32 (12.3%)	156 (60%)	

Table (4): Correlation between financial support of participants and academic performance of medical laboratory students (Financial support).....

Financial support	High CGPA	Low CGPA	Total	P. value
Self	1 (0.4%)	0 (0%)	1 (0.4%)	0.721
Parents	190 (72.6%)	37 (13.7%)	(86.3%)	
Husband	7 (2.7%)	0 (0%)	(2.7%)	
Other relative	19 (6.8%)	7 (2.7%)	(9.6%)	

Table (5): Correlation between economic status of participants and academic performance of medical laboratory students

Economic Status	High CGPA	Low CGPA	Total	P. value
High	(8.1%)	(1.2%)	(9.2%)	0.651
Moderate	(65%)	(13.5%)	(78.5%)	
Low	(9.6%)	(2.7%)	(12.3%)	

Table (6): Correlation between parent education of participants and academic performance of medical laboratory students.....

Father Education	High CGPA	Low CGPA	Total	P. value
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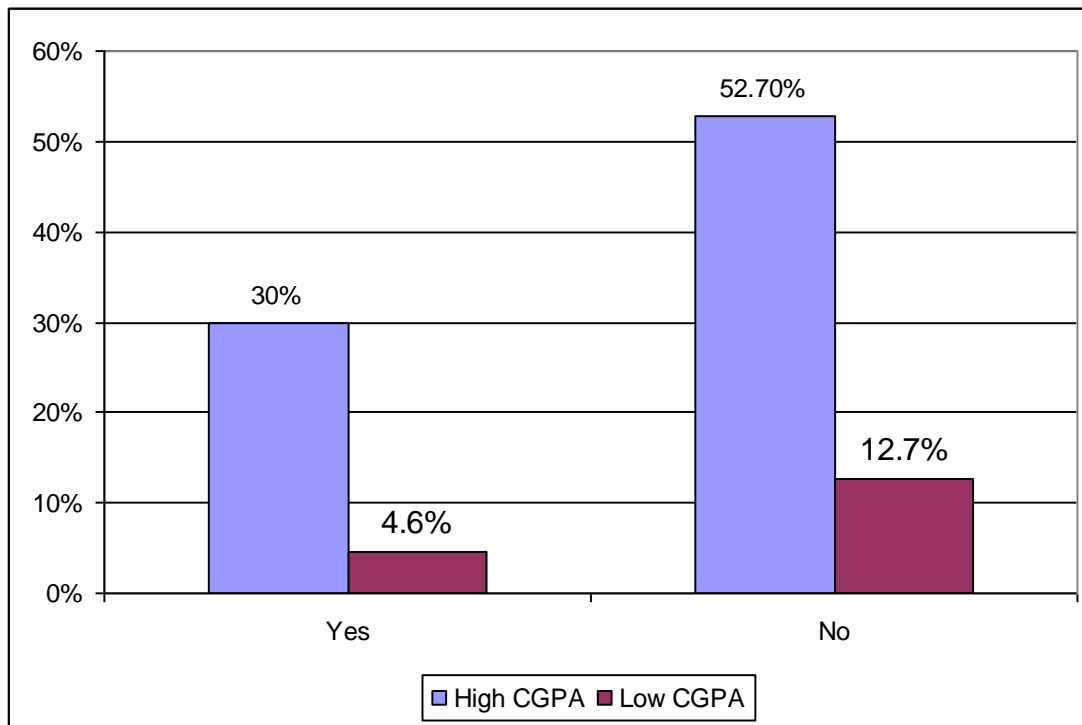
Illiterate	14 (5.4%)	7 (2.7%)	21 (8.1%)	0.407
Primary	30 (11.5%)	6 2.3%)	36 (13.8%)	
Secondary	74 (28.5%)	12 (4.6%)	86 (33.1%)	
Graduate	62 (23.8%)	12 (4.6%)	74 (28.5%)	
Post-graduate	33 (12.7%)	8 (3.1%)	41 (15.8%	

Mother Education	High CGPA	Low CGPA	Total	P. value
Illiterate	20 (7.7%)	3 (1.2%)	23 (8.8%)	0.198
Primary	40 (15.4%)	12 (4.6%)	52 (20%)	
Secondary	97 (37.7%)	16 (6.2%)	113 (43.5%)	
Graduate	44 (16.9%)	7 (2.7%)	51 (19.6%)	
Post-graduate	13 (5.0%)	7 (2.7%)	20 (7.7%)	0.04

Table (7): Correlation between parent occupation of participants and academic performance of medical laboratory students.....

Father occupation	High CGPA	Low CGPA	Total	P. value
Employee	175 (67.3%)	29 (11.2%)	204 (78.5%)	0.021
Employer	6 (2.3%)	6 (2.3%)	12 (4.6%)	
Labor	27 (10.4%)	0 (0%)	27 (10.4%)	
Others	6 (2.3%)	11(4.2%)	6 (2.3%)	
Inapplicable	0 (0%)	0 (0%)	11 (4.2%)	

Mother occupation	High CGPA	Low CGPA	Total	P. value
Employee	102 (39.2%)	31 (11.9%)	(71.1%)	0.189
Employer	112 (43.1%)	13 (5%)	(48.1%)	
Labor	2 (0.8%)	0 (0%)	(0.8%)	
Others	0	0	0%	
Inapplicable	0	0	0%	



Figur (3): Correlation between Physician in family as guidance of participants and academic performance of medical laboratory students.....

Table (8): Correlation between admission to the University (higher secondary school) of Participants and academic performance of medical laboratory students.....

Secondary Certificate	High CGPA	Low CGPA	Total	P. value
Sudanese	168 (64.6%)	41 (15.8%)	209 (80.4%)	0.002
Arabic	39 (15%)	4 (1.5%)	43 (16.5%)	
Igcse	1 (0.4%)	0	1 (0.4%)	
Other	7 (2.7%)	0	7 (2.7%)	

Table (9): Correlation between preadmission criteria Secondary School exam attempted and academic performance of medical laboratory students.....

	High CGPA	Low CGPA	Total	P. value
One	171 (65.8%)	25 (9.6%)	196 (75.4%)	0.241
Two	43 (16.5%)	15 (5.8%)	57 (21.9%)	
Three or more	3 (1.2%)	4 (1.5%)	7 (2.7%)	

Table (10): Correlation between preadmission criteria of English language proficiency and academic performance of medical laboratory students.....

English Proficiency	High CGPA	Low CGPA	Total	P. value
Fluent	22 (8.5%)	1 (0.4%)	23 (8.8%)	0.222
Good	152 (58.5%)	34 (13.1%)	186 (71.5%)	
Deficient	41 (15.8%)	10 (3.8%)	51 (19.6%)	

Table (11): Correlation between preadmission criteria of Time extended on T.V & social network /chatting and academic performance of medical laboratory students.....

Time on T.V	High CGPA	Low CGPA	Total	P. value
Not watching	57 (21.9%)	13 (5%)	70 (26.9%)	0.957
Less than 2 hours	80 (30.8%)	15 (5.8%)	95 (36.5%)	
2-4 hours	48 (18.5%)	11 (4.2%)	59 (22.7%)	
More than 4 hours	30 (11.5%)	6 (2.3%)	36 (13.8%)	

Time on social network/chatting	High CGPA	Low CGPA	Total	P. value
Never	11 (4.2%)	2 (0.8%)	13 (5%)	0.509
Less than 2 hours	54 (20.8%)	9 (3.5%)	63 (24.2%)	
2-4 hours	71 (27.3%)	12 (4.6%)	83 (31.9%)	
More than 4 hours	79 (30.4%)	22 (8.5%)	101 (38.8%)	0.036

Table (12): Correlation between preadmission criteria Sleeping hours a day and academic performance of medical laboratory students....

Sleeping hours/a day	High CGPA	Low CGPA	Total	P. value
Less than 6 hours	56 (21.5%)	14 (26.9%)	70 (26.9%)	0.541
6-8 hours	129 (49.6%)	23 (8.8%)	152 (58.5%)	0.048
More than 8 hours	30 (11.5%)	8 (3.1%)	38 (14.6%)	

Table (13): Correlation between preadmission criteria Motivation to study and academic performance of medical laboratory students....

	High CGPA	Low CGPA	Total	P. value

Enjoy studying	79 (30.4%)	16 (6.2%)	95 (36.5%)	0.642
Had high scores	34 (13.1%)	10 (3.8%)	44 (16.9%)	
Pressed by family	29 (11.2%)	3 (1.2%)	32 (12.3%)	
Want to get a scholarship/get hired by the university.	45 (17.3%)	9 (3.5%)	54 (20.8%)	
do not feel motivated	28 (10.8%)	7 (2.7%)	35 (13.5%)	

Table (14): Correlation between preadmission criteria studying habits and academic performance of medical laboratory students....

	High CGPA	Low CGPA	Total	P. value
I used to study				
Alone	130 (50%)	20 (7.7%)	150 (57.7%)	0.830
With one of my colleague	46 (17.7%)	9 (3.5%)	55 (21.2%)	
In group	39 (15%)	16 (6.2%)	55 (21.2%)	
Studying hour/a day				
Don't study daily	75 (28.8%)	21 (8.1%)	96 (36.9%)	0.468
Less than 2 hours	30 (11.5%)	4 (1.5%)	34 (13.3%)	
2-4 hours	79 (30.4%)	15 (5.8%)	94 (36.2%)	
More than 4 hours	31 (11.9%)	5 (1.9%)	36 (13.8%)	

Table (15): Correlation between preadmission criteria Weekend studying hours and academic performance of medical laboratory students.....

	High CGPA	Low CGPA	Total	P. value
Do not study	54 (17.3%)	14 (5.4%)	68 (26.2%)	0.622
Less than 5 hours	84 (32.3%)	13 (5%)	97 (37.3%)	
6-8 hours	45 (17.3%)	11 (4.2%)	56 (21.5%)	

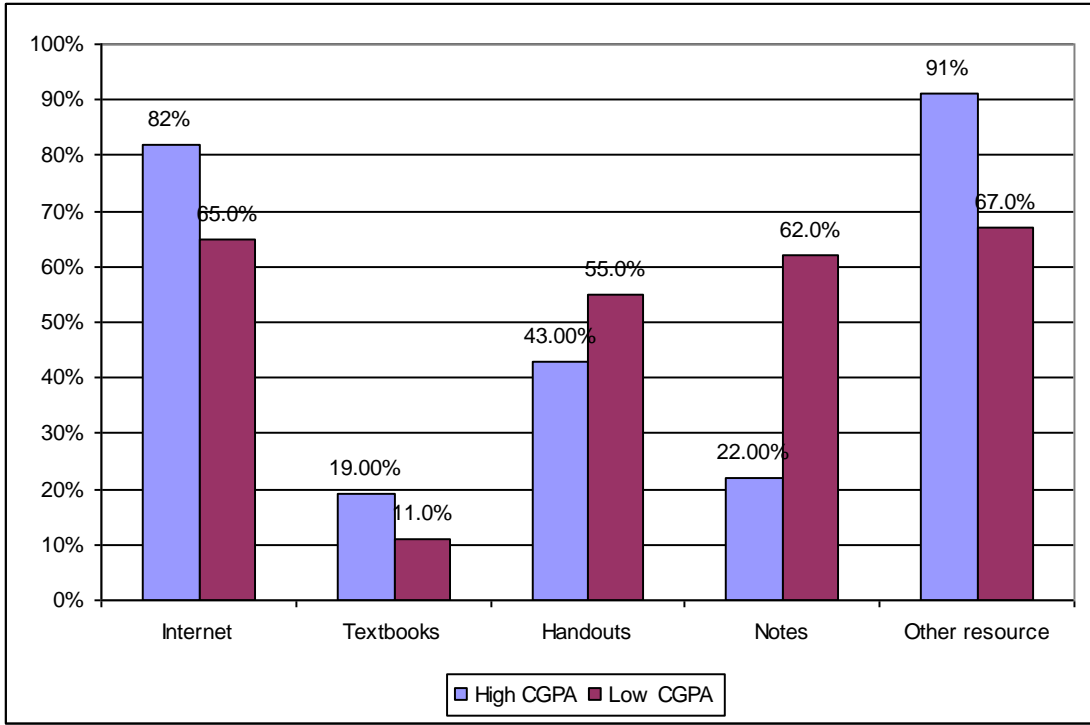
More than 8 hours	32 (12.3%)	7 (2.7%)	39 (15%)	
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Table (16): Correlation between preadmission criteria Facing difficulty and academic performance of medical laboratory students....

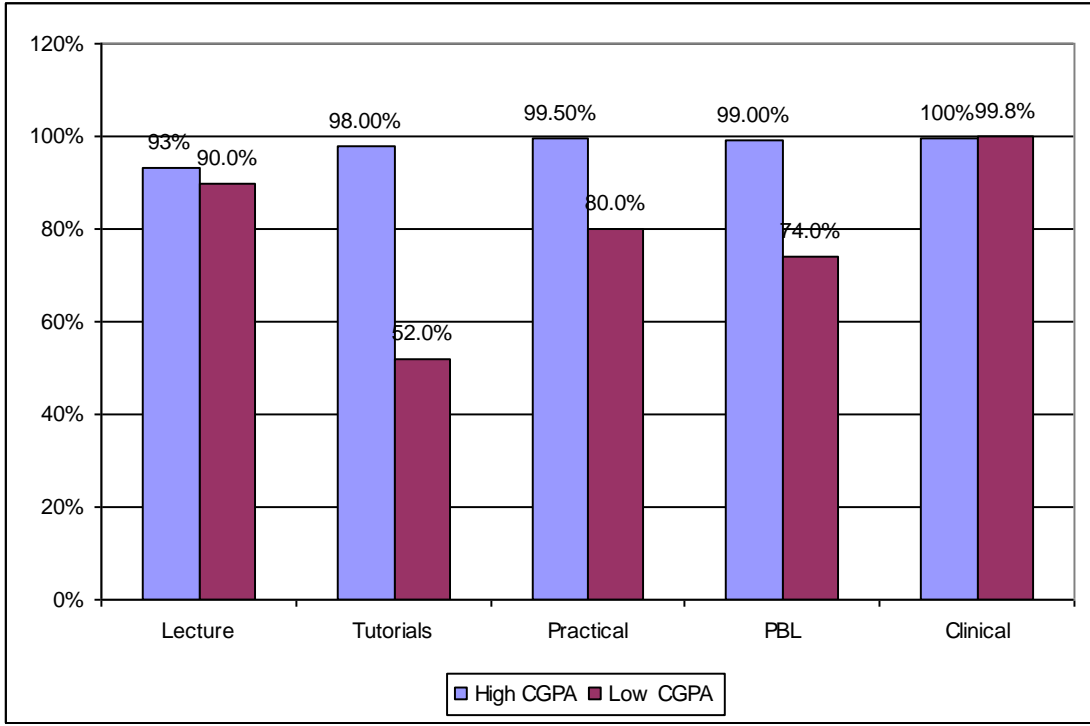
	High CGPA	Low CGPA	Total	P. value
when facing difficulty				
Self directed learning	82 (31.5%)	13 (5%)	95 (36.5%)	0.696
Ask faculty member	31 (11.9%)	7 (2.7%)	38 (14.6%)	
Ask colleague	91 (35%)	22 (8.5%)	113 (43.5%)	
Skip it	11 (4.2%)	3 (1.2%)	14 (5.4%)	

Table (17): Correlation between preadmission criteria activity during vacation and academic performance of medical laboratory students....

	High CGPA	Low CGPA	Total	P. value
Activity During Vacation:				
Conduct research	15 (5.8%)	4 (1.5%)	19 (7.3%)	0.447
Enjoy vacation	126 (48.5%)	30 (11.5%)	156 (60%)	
Have clinical training	50 (19.2%)	7 (2.7%)	57 (21.9%)	
Start reading for the next year subjects	20 (7.7%)	2 (0.8%)	22 (8.5%)	
Working	4 (1.5%)	2 (0.8%)	6 (2.3%)	



Figur (4): Correlation between the reading resources and academic performance of medical students at



Figur (5): Correlation between the percentage of attendance of academic activities and academic performance of medical laboratory students at

Chapter (4)

Discussion and conclusion

4-1 Discussion

Identifying the factors of good academic performance are considered important element to achieve optimized level of medical education, this study aimed to focus on highlighting the major contributing factors of academic performance among medical laboratory students in particular since they are considered one of the essential medical field students who need special focus on their academic demands and its associated factors.

This study shows that there is a statistically significant relationship between good academic performance and the personal health status of medical laboratory student's in terms of medical conditions or disability state including Bronchial asthma, Migraine, Insulin dependent Diabetes Mellitus and corrected congenital heart defect are some examples as shown in table(3), mean while Father's occupation, being with family and secondary school certificate type have no significant association with the current academic performance (table1,2) Figure (2), whereas the prior admission to university has significant relationship with expected academic performance since the study showed that Preadmission criteria to the university whether general or private has clearly influenced the academic performance of the students (P values = 0.002) as shown in Table (8). Meanwhile sleeping hours per day between 6-8 hours have also shown a significant relationship with the students' academic performance as seen in table (12) , regarding study used tools, a significant relationship was shown between academic performance positive outcome and those students relay on internet and video lectures as learning resources as shown p value 0.011) in compare to those depend on traditional resources of textbook and study notes who showed up poor academic performance (P value 0.005) as shown in Figure (4) .

As mentioned, the existence of a chronic medical disease has direct impact on medical laboratory student's academic performance during the period of the study (p value 0.023). There had been few previous researches assessed the impact of medical diseases on the academic performance, but it was obvious from this study that medical diseases had an impact on students' attendance and sleep pattern (P value less than 0.05). Another issue that was not considered was stress. Anxiety and tension levels were extremely high, and the percentage of medical laboratory students (92%) was the same (37).

Regarding father profession 10.4% of participants mentioned that their fathers were laborers. All of them had excellent academic performance and that may be attributed to perceived motivation or

inflicted family pressure as shown in table (5), compared to another study of AAMC that showed socioeconomic factors can affect educational opportunities and outcomes, as most of medical students come from the high two levels of family income; and SES mainly based on family education and occupation (16).

Furthermore, 34.6% of the participants' families were doctors, nevertheless the presence of physicians in the family as guidance has no a good effect on medical students' performance which disagrees with the results of Alfayez study aimed to assess social and cultural factors influencing medical school grade performance that showed up a clear influence of family education and the presence of physicians in the family in the academic performance of students (14).

Admissions to universities, whether general or private, have influencing role on students' academic performance according to our study result, In contrast to Mohamed's study held in Sudan, 54.5% of medical students who granted private entrance to medical school had poor academic performance, thus It has been clearly prominent that, the medical students who offered private admission have worse academic performance than those with general public admission (p value 0.002), speaking to that a study was carried out at Nile Valley University to compare the academic performance of private admission medical students to their public admission colleagues, results Between private and public admission students, there were statistically significant variations in academic performance as 78.4% of privately admitted students have progressed without subsequent delay, meanwhile 90% of the public admission students did so. Also increasing the number of SSCE attempts also had a determinant role on performance outcome as shown in table (9), The pass rate in all phases of medical study as well as the Cumulative Grade Point Average (CGPA) was lower among private admission students. Of re-sits (17). This difference is proportionate to the difference in grades obtained at SSCE and number of re-sits. (17)

In addition, better performance was found in students with none Sudanese - none Arabic secondary school certificates, whilst the lowest performance was observed among students with Arabic secondary school certificates (P value 0.001) which coincides the results obtained in University of Gezira, Sudan (38).

The majority of the medical students with high CGPA are used to sleep between six to eight hours (49.6%) meanwhile those take more than eight hours or less than six hours per day have

developed poor academic performance as seen in table (12), this observed relationship of sleeping pattern agree with Bahmamm *et al* study which stated that, decreased nocturnal sleep time, late bedtimes during weekdays and weekends and increased daytime sleepiness are negatively associated with academic performance of medical students (39) as well as it strongly agrees with the result of Mansur study conducted in Gezira University which stated that ;excellent medical students don't exceed 8 hours for daily sleeping period (38) . The relationship between Partial sleep impecunious (less than 6 hours of sleep per night) and deteriorated academic performance may be attributed to lack of attention, attentiveness, remembrance, and judgmental thinking in a person's day to day life (40).

Attending of each one to the college activities is strongly linked to excellent academic performance in our study. The negative correlation with poor performance suggests the value of monitoring attendance and identifying students at risk for poor performance, as medical laboratory students had fewer attending lectures and tutorial compared with clinical and practical sessions, so It is concluded that; making lecture attendance by educators is mandatory factor as it may adversely affect the performance of some students who aren't attending lectures in regular basis.

Attendance could be enhanced by combining classroom instruction with hospital and laboratory training. There would be a significant increase in attendance if there were sign-in sheets, fewer gaps between sessions, and numerous lectures within the same day. Medical laboratory schools could examine these variables in the future to improve student motivation to attend classes (43).

In our study, no other social or family characteristics were identified to have an impact on the academic performance of medical laboratory students. Gender, marital status, family size, socioeconomic condition of the family, degree of education of the parents, and the mother's career are some examples of these characteristics. Meanwhile significant relationship was shown between living of students with their families and their academic performance as mentioned in Table 2, this significant relationship may be due to social stability of those ones living within their families as well as the psychological impact of family existence in terms of student's motivation and support.

English language proficiency was one of the pre-admission criteria that had no effect on academic success and that contradicts the results of the study conducted by Al Shawwa et al, which showed that poor command of the English language appears to be a significant negative factor on medical laboratory student's academic performance (2) as well as it disagrees with the study of Salam on son carried out in 2008 at Australian university through which the Written and aural English proficiency were assessed with the Screening Test for Adolescent Language, and it showed that students who speak English as second language face considerable challenges in English language universities, yet a little was mention regarding specific association with final academic performance (21). .

Video tutorials and the internet were the least used resources among students, yet it has found to be beneficial in the training of clinical laboratory skills as shown in figure 4. On the other hand, the learners have both opportunities and obstacles when using technology as seen in the mentioned result, and that agrees with the study of Hye Won Jang who confirms the positive impact of OSCE videos and advanced technologies on students learning of clinical skills (44).

E-learning laboratory education is offered in a variety of ways. Offering online films on laboratory skills is a popular format among them. Although medical laboratory videos have been shown to improve learning outcomes, there is a lack of study on how to make them more effective. Furthermore, there is little guidance on how to integrate e-learning into the curriculum despite the recommendation that information technology resources be integral part to supporting the clinical and laboratory skills curriculum as Hye Won Jang stated on his study (44).

4-2Conclusion:

- This study was set out to determine major factors contribute to performance of undergraduate medical laboratory students in international university of Africa with focused view to understand some of the factors of success which may lead to creation of innovative approaches for providing more successful academic atmosphere for students and university.
- We found in this study the father's occupation, presences with family, and chronic medical condition during medical studding (Bronchial asthma, Migraine, Insulin dependent Diabetes Mellitus and corrected congenital heart defect are some examples).

admittance to the faculty, whether general or private, secondary school certificate type, sleeping hours per day between 6-8 hours, attendance to all academic and clinical activities have statistically significant relationship with good academic performance of medical laboratory students.

- Also, other factors were detected with variety in influencing role on performance including socioeconomic status and previous admission criteria, thus it is suggested to use other tools to further investigate these other factors that could affect the academic performance of the medical students.

4-3 Recommendations

(Recommendation for university):

- 1-The college should be able to identify variation in obtained GPA among students while they are progressing to higher levels of study, in order to mentor this variation between poor and good students accordingly for better performance, and consistency of performance.
- 2- Recommended that the modifiable factors associated with poor academic performance should be identified early in the medical course and prompt modifications should be taken.
- 3- Students should be the helped when facing any difficulty in education fields so students support system in the faculty should be active.
- 4- Other similar studies with larger sample size must be applied to improve these factors.
- 5- Students with chronic illnesses and impairments should be given extra attention and advice.
- 6-Increase the overall attendance of medical laboratory students, Interactive Lectures and tutorials should be given special attention.
- 7-Implementation of the video and E-learning in all university curricula (Audiovisual aids).
- 8-The students should focus on improving their sleeping pattern since it is determinant factor of the expected level of performance.
- 9-Teachers should pay special attention to shy students by encouraging and motivating them.
- 10-Academic counseling (support) should be a requirement in all medical and health institutes to promote staff-student engagement, foresee students' social and learning challenges, and intervene at the appropriate moment.

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10. Level of education of the mother:

- a) Illiterate b) Primary c) Secondary D) Graduate
E) Post-graduate

11. Occupation of your father (-----)

12. Occupation of your mother (-----)

13. Physician in the family:

- a) Yes b) No

14. Secondary School Certificate:

- a) Sudanese b) Arabic c) Other (specify-----)

15. Number of Secondary School Exam attempts

(-----)

16. Regarding your English proficiency:

- a) You speak fluent English.
b) Your English is good enough to study and understand day-to-day conversations.
c) Your English is deficient, that you face some difficulties when you study.

17. How many hours do you use on movies, series, and music/ day?

- a) Less than 2 hours
b) 2–4 hours/day
c) More than 4 hours/day
d) You do not watch television.

18. How many hours do you spend on social networking/chatting (online) “not related to college work”?

- a) Less than 2 hours
b) 2–4 hours
c) More than 4 hours
d) You do not use it.

19. Regarding your sleeping hours/day: (including nap hours)

- a) You sleep less than 6 hours/day.
b) You sleep 6–8 hours/day.
c) You sleep more than 8 hours/day.

20. You are motivated to study harder because: (choose one)

- a) You enjoy studying.
b) You I have always had high scores.
c) You feel pressured by my family.
d) You want to get a scholarship/get hired by the university.
e) You do not feel motivated.

21. When you study:

- a) You like to study alone.
- b) You like to study with one of your colleagues.
- c) You like to study in groups.

22. During the day, You I study:

- a) Less than 2 hours/day.
- b) 2–4 hours/day.
- c) More than 4 hours/day.
- d) You do not study daily

23. During the weekends, You study:

- a) Less than 5 hours/day.
- b) 5–8 hours/day.
- c) More than hours/day.
- d) You do not study during weekends.

24. Arrange the following resources according to their importance in your studying: from 1 to 5, in which 1 is most important and 5 is least important:

- a) Internet (.....)
- b) Textbooks (.....)
- c) Handouts (.....)
- d) Your own notes (.....)
- e) Other (videos) (.....)

25. When You study You use the following: (choose the most important one)

- a) Mapping
- b) Note forming
- c) Highlighting
- d) Summarizing
- e) Recording
- f) Reading loudly
- g) Reading silently
- h) Start by reading then memorizing
- i) Start by memorizing

26. Rate the following according to your attendance

- 1) 100% 2) 75% 3) 50% 4) 25% 5) I do not attend
- a) lectures (-----)
 - b) Tutorials (-----)
 - c) Practical sessions (-----)
 - d) Problem-based learning (-----)
 - e) Clinical teaching (-----)

27. When facing difficulties during studying, you:

- a) Seek clearance independently (self-directed learning).
- b) Ask a colleague.
- c) Ask a faculty member.
- d) Skip it.

28. When you study, you: (choose one)

- a) Drink coffee.
- b) Eat snacks.
- c) Have to ensure silence and no interruptions.
- d) Favor a certain place (eg, I only like to study in my living room).
- e) Favor a certain body position (lying on the floor, sitting on a desk).
- f) Listening to Qur'an/music and television.
- g) None of the above.

29. During vacations, you prefer to: (choose one)

- a) Start reading for the next year subjects.
- b) Have clinical training.
- c) Conduct research.
- d) Enjoy your vacation.

30. Number of (F) courses: (-----)

Thanks for participation